

1 What is claimed is:

- 2 1. A method for serving requests for resources by applications running on a computer,
3 the computer being part of a network of computers, each computer on said network
4 comprising a host program, each said host program comprising a symbiont, each
5 said symbiont encapsulating one data processing resource, said method comprising
6 the steps of:
- 7 a. said host receiving a request for said resource from an application running on said
8 host's computer;
- 9 b. said host contacting said symbiont that encapsulates said resource; and
10 c. said symbiont either serving said request, or redirecting it to another replicate of
11 itself, or replicating itself onto said host.
- 1 2. The method according to claim 1, wherein said host provides information relating to
2 said symbionts available on said network to applications running on said host's
3 computer.
- 1 3. The method according to claim 1, wherein said host provides information relating to
2 said symbionts available on said host's computer to said network.
- 1 4. The method according to claim 1, wherein various replicates of said symbiont is
2 connected together, to support a measure of communication among said replicates.
- 1 5. The method according to claim 4, wherein said various replicates of said symbiont
2 are connected together in a multiply connected ring.
- 1 6. The method according to claim 1 or claim 4, wherein said step of said symbiont either
2 serving said request, or redirecting it to another replicate of itself, or replicating itself
3 onto said host, said step further comprising the steps of:
- 4 a. determining load on said symbiont, if load on said symbiont is less than its
5 threshold, I_{\max} , said symbiont serving said request;

- 6 b. determining load on said symbiont, if load on said symbiont is more than its
7 threshold, I_{\max} , and if load on all said connected replicates of said symbiont, is
8 also more than their threshold, t , said symbiont replicating itself on said host;
- 9 c. determining load on said symbiont, if load on said symbiont is more than its
10 threshold, I_{\max} , and if said host has been redirected more than a predetermined
11 number of times, said symbiont replicating itself on said host; and
- 12 d. determining load on said symbiont, if load on said symbiont is more than its
13 threshold, I_{\max} , and if at least one of said connected replicates of said symbiont,
14 has a load less than their threshold, t , one of said connected replicates with load
15 less than its threshold serving said request.
- 1 7. The method according to claim 6, wherein said threshold, I_{\max} , of said symbiont,
2 evolves with time according to some probabilistic measure.
- 1 8. The method according to claim 6, wherein said threshold, t , of said replicate of said
2 symbiont is less than said threshold, I_{\max} of said symbiont.
- 1 9. The method according to claim 6, wherein said threshold, t , of said replicate of said
2 symbiont, evolves with time according to some probabilistic measure.
- 1 10. The method according to claim 6, wherein said step of one of said connected
2 replicates with load less than its threshold serving said request, further comprises
3 said replicate with least load serving said request.
- 1 11. The method according to claim 6, wherein said step of one of said connected
2 replicates with load less than its threshold serving said request, further comprises
3 said replicate closest to said host serving said request.
- 1 12. A system for serving requests for resources by applications running on a computer,
2 the computer being part of a network of computers, each computer on said network
3 comprising a host program, each said host comprising a symbiont, each said
4 symbiont encapsulating one data processing resource, said system comprising:

- 5 a. means for said host receiving a request for said resource from an application
6 running on said host's computer;
- 7 b. means for said host contacting said symbiont that encapsulates said resource;
8 and
- 9 c. means for said symbiont handling said request.

1 13.The system according to claim 12, wherein said host provides information relating to
2 said symbionts available on said network to applications running on said host's
3 computer.

1 14.The system according to claim 12, wherein said host provides information relating to
2 said symbionts available on said host's computer to said network.

1 15.The system according to claim 12, wherein said various replicates of said symbiont
2 are connected together, to support some measure of communication among said
3 replicates.

1 16.The system according to claim 15, wherein said various replicates of said symbiont
2 are connected together in a multiply connected ring.

1 17.The system according to claim 12 or claim 15, wherein said means for said symbiont
2 handling said request, further comprises:

- 3 a. means for said symbiont serving said request,
- 4 b. means for said symbiont replicating itself on said host,
- 5 c. means for one of said connected replicates with load less than its threshold
6 serving said request.

1 18.The system according to claim 17, wherein said means for one of said connected
2 replicates with load less than its threshold serving said request, further comprises
3 means for said replicate with least load serving said request.

1 19.The system according to claim 17, wherein said means for one of said connected
2 replicates with load less than its threshold serving said request, further comprises
3 means for said replicate closest to said host serving said request.

1 20.A method for managing hosts and symbionts in a network of computers, each
2 computer on said network comprising a host program, each said host program
3 comprising a symbiont, each said symbiont encapsulating one data processing
4 resource, said method comprising the steps of:

- 5 a. initializing a set of hosts and symbionts on said network;
- 6 b. adding a new symbiont for an existing resource to said network, whenever there is
7 a need for one;
- 8 c. adding a new symbiont for a new resource to said network whenever said new
9 resource is to be added; and
- 10 d. deleting said symbiont from said network of computers whenever certain
11 conditions are met.

1 21.The method according to claim 20, wherein said host provides information relating to
2 said symbionts available on said network to applications running on said host's
3 computer.

1 22.The method according to claim 20, wherein said host provides information relating to
2 said symbionts available on said host's computer to said network.

1 23.The method according to claim 20, wherein various replicates of said symbiont are
2 connected together, to support some measure of communication among said
3 replicates.

1 24.The method according to claim 23, wherein said various replicates of said symbiont
2 are connected together in a multiply connected ring.

- 1 25. The method according to claim 20, wherein said initializing step further comprises
2 the steps of:
- 3 a. initializing a host on each computer of said network;
 - 4 b. encapsulating said resources that are to be initialized in one said symbiont each;
 - 5 c. marking original copy of each of said symbiont encapsulating said resource, as
6 immortal so that they are always present in said network; and
 - 7 d. initializing said symbionts on computers in said network, wherein said symbiont
8 runs in said host.
- 1 26. The method according to claim 25, wherein a symbiont run in said host.
- 1 27. The method according to claim 20 or claim 23, wherein said step of adding a new
2 symbiont for an existing resource to said network, whenever there is a need for one,
3 further comprises the steps of:
- 4 a. determining load on said symbiont, if load on said symbiont is more than its
5 threshold, I_{\max} , and if load on all said connected replicates of said symbiont, is
6 also more than their threshold, t , said symbiont replicating itself on said host;
 - 7 b. determining load on said symbiont, if load on said symbiont is more than its
8 threshold, I_{\max} , and if said host has been redirected more than a predetermined
9 number of times, said symbiont replicating itself on said host; and
 - 10 c. determining load on said symbiont, in either case, connecting said new symbiont
11 to other said symbionts of said existing resource.
- 1 28. The method according to claim 27, wherein said threshold, I_{\max} , of said symbiont,
2 evolves with time according to some probabilistic measure.
- 1 29. The method according to claim 27, wherein said threshold, t , of said replicate of said
2 symbiont is less than said threshold, I_{\max} of said symbiont.

1 30.The method according to claim 27, wherein said threshold, t , of said replicate of said
2 symbiont, evolves with time according to some probabilistic measure.

1 31.The method according to claim 20, wherein said step of adding a new symbiont for a
2 new resource to said network whenever a new resource is to be added, further
3 comprises the steps of:

- 4 a. encapsulating said new resource to be initialized in a new symbiont;
- 5 b. marking original copy of said new symbiont encapsulating said new resource, as
6 immortal so that it is always present in said network; and
- 7 c. initializing said new symbiont on a computer in said network, wherein said new
8 symbiont runs in said host.

1 32.The method according to claim 20, wherein said step of deleting said symbiont from
2 said network of computers whenever certain conditions are met, further comprises
3 the steps of:

- 4 a. said symbionts checking their loads at regular time intervals; and
- 5 b. said symbionts dying if their load is less than a threshold, l_{min} .

1 33.The method according to claim 32, wherein said time intervals evolve with time.

1 34.The method according to claim 32, wherein said threshold, l_{min} , evolves with time.

1 35.The method according to claim 32, wherein said symbionts marked immortal are
2 never deleted from said network.

1 36.A system for managing hosts and symbionts in a network of computers, each
2 computer on said network comprising a host, each said host comprising a symbiont,
3 each said symbiont encapsulating one data processing resource, said system
4 comprising:

- 5 a. means for initializing a set of hosts and symbionts on said network;

- 6 b. means for adding a new symbiont for an existing resource to said network;
- 7 c. means for adding a new symbiont for a new resource to said network; and
- 8 d. means for deleting said symbiont from said network of computers.

1 37.The system according to claim 36, wherein said host provides information relating to
2 said symbionts available on said network to applications running on said host's
3 computer.

1 38.The system according to claim 36, wherein said host provides information relating to
2 said symbionts available on said host's computer to said network.

1 39.The system according to claim 36, wherein various replicates of said symbiont are
2 connected together, to support some measure of communication among said
3 replicates.

1 40.The system according to claim 39, wherein said various replicates of said symbiont
2 are connected together in a multiply connected ring.

1 41.The system according to claim 36, wherein said initializing means further comprises:

- 2 a. means for initializing a host on each computer of said network;
- 3 b. means for encapsulating said resources that are to be initialized in one said
4 symbiont each;
- 5 c. means for marking original copy of each of said symbiont encapsulating said
6 resource, as immortal so that they are always present in said network; and
- 7 d. means for initializing said symbionts on computers in said network, wherein said
8 symbiont runs in said host.

1 42.The system according to claim 41, wherein zero or more symbionts run in said host.

1 43.The system according to claim 36 or claim 39, wherein said means for adding a new
2 symbiont for an existing resource to said network, whenever there is a need for one,
3 further comprises:

- 4 a. means for said symbiont replicating itself on said host as a new symbiont; and
- 5 b. means for connecting said new symbiont to other said symbionts of said existing
6 resource.

1 44.The system according to claim 36, wherein said means for adding a new symbiont for
2 a new resource to said network whenever a new resource is to be added, further
3 comprises:

- 4 a. means for encapsulating said new resource to be initialized in a new symbiont;
- 5 b. means for marking original copy of said new symbiont encapsulating said new
6 resource, as immortal so that it is always present in said network; and
- 7 c. means for initializing said new symbiont on a computer in said network, wherein
8 said new symbiont runs in said host.

1 45.The system according to claim 36, wherein said means for deleting said symbiont
2 from said network of computers whenever certain conditions are met, further
3 comprises:

- 4 a. means for said symbionts checking their loads at regular time intervals; and
- 5 b. means for said symbionts dying if their load is less than a threshold, I_{min} .

1 46.The system according to claim 45, wherein said time intervals evolve with time.

1 47.The system according to claim 45, wherein said threshold, I_{min} , evolves with time.

1 48.The system according to claim 45, wherein said symbionts marked immortal are
2 never deleted from said network.